Attachment Q

Supplemental Alternative Analysis

8. Alternative land routes were discounted because of cost and environmental impacts. The information presented regarding the conditions along the potential land routes is insufficient. It is not clear whether the land routes would affect wetlands or other sensitive areas. Provide a further discussion of the environmental conditions and effects.

11. Statements are made in the Alternatives Analysis as well as other documents rejecting the routing of the cable along railroad rights-of-way in other areas due to their proximity to wetlands, critical environmental areas, etc. It appears that the presumption has been made that the disturbance of the existing railroad bed, transiting through sensitive environmental areas, would be considered a greater environmental impact than excavation in water bodies. Reevaluate utilizing railroad or other existing corridors and weigh the environmental impact of installing the cables along these routes as compared to the proposed in-water routes and provide the results of such re-evaluation.

28. Alternative land routes are discounted because of cost (likely much more expensive) and environmental impacts. Little information is presented about the conditions along the potential land routes regarding the existing environment. Discuss whether or not the land routes would affect wetlands or other sensitive areas.

1.0 Introduction

On March 30, 2010, Champlain Hudson Power Express, Inc (CHPEI) submitted an application for a Certificate of Environmental Compatibility and Public Need (Application) for the construction of an electric transmission project (Project) pursuant to Article VII of the New York Public Service Law. In conformance with the New York State Public Service Commission (Commission) rules, an Alternatives Analysis was provided with this application (Exhibit 3). Commission staff have requested additional information regarding the potential land route alternatives, particularly the presence of wetlands or other sensitive areas. Staff have also requested that CHPE provide a comparison of the environmental impacts of the Project against potential overland routes, including the utilization of railroad or other existing corridors.

2.0 Proposed Project

The proposed Project consists of a 1,000-MW HVDC transmission system that extends between Montreal, Canada, and New York City, New York.

The proposed Project will include underwater and underground HVDC transmission cables connecting an HVDC converter station in Canada with an HVDC converter station in Yonkers, New York. No overhead transmission lines will be constructed as part of the proposed Project. To the extent possible, CHPEI proposes to install its transmission cables along and within existing waterways to minimize the long-term land use and visual impacts typically associated with traditional overhead transmission lines.

The proposed Project alignment was developed considering geographical factors and other constraints to potential transmission lines connecting Canada to the greater New York City area. These factors include (but are not limited to):

- The location of existing commercial, industrial, and residential development;
- The location and nature of previously disturbed rights-of-way that can be utilized for new transmission cable installation, including those rights-of-way associated with existing rail lines and electric transmission lines;
- The location and nature of New York State Forest Preserve lands in the Adirondack Park; and
- Ongoing remediation activities associated with the Upper Hudson River PCB Dredging Project.

A number of alternative transmission routes were considered, including overhead routes within existing transmission corridors, underground routes within existing railroad corridors, and underwater routes. Subsequent to an evaluation of transmission line technology, cost, and environmental impact, a preferred Project alignment was identified that primarily utilizes existing waterways to minimize the constraints that these factors impose on the construction of a new major transmission system. This alignment follows the most feasible direct route between the converter station near Montreal, Canada, and the facilities of Consolidated Edison Company of New York, Inc. in New York City.

2.1 Proposed Project Route

The proposed Project consists of an HVDC transmission system between Montreal, Canada and Yonkers, New York, with HVAC lines extending from Yonkers to New York City. The proposed Project's HVDC transmission system is buried within waterways, to the greatest extent feasible, along the entire Project route. At the outset of the project, a continuous waterway network from the Canadian border to New York City was identified which consisted of Lake Champlain, the Champlain Canal, the Hudson River, the Harlem River, and the East River (Figure 2-1). However, during the initial Project planning activities, U.S. Environmental Protection Agency staff stated that HVDC cable installation could not occur within the Upper Hudson River PCB Dredging Project area prior to completion of the currently planned dredging activities.

Based on the dredging schedule of the Upper Hudson River PCB Dredging Project, it was determined that HVDC cable installation in this portion of the Champlain Canal/Hudson River was not feasible within the Project planning window. Therefore, CHPEI developed a terrestrial bypass route to circumvent the Upper Hudson River PCB Dredging Project area. With the exception of overland bypass routes to avoid sections of the Champlain Canal and the Upper Hudson River PCB Dredging Project, as well as the connections from the waterway to the converter station, the proposed Project route is located and buried entirely within waterways.

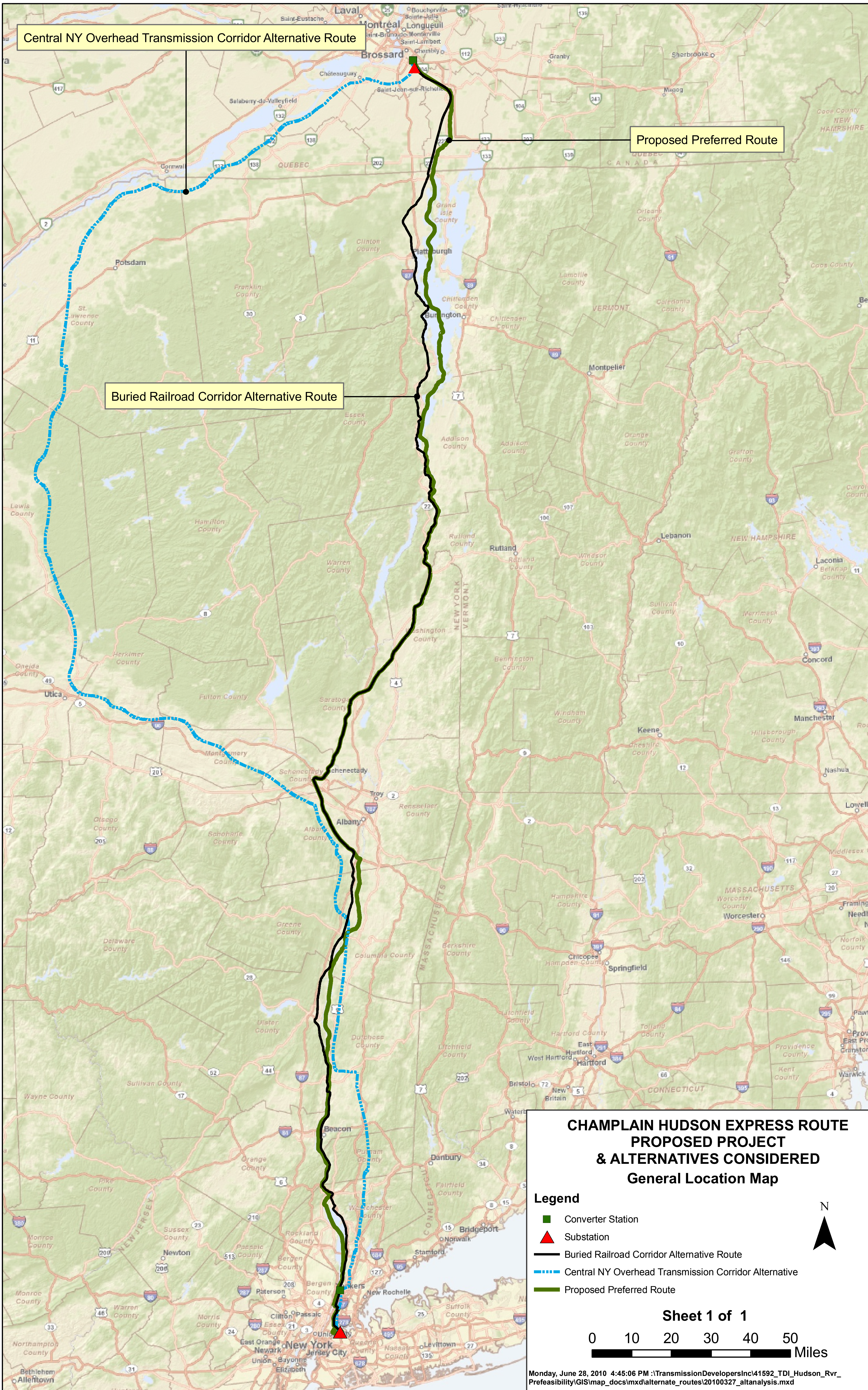
From the Canadian border, the proposed Project route extends through Lake Champlain entirely within the jurisdictional waters of New York. At the southern end of Lake Champlain, the proposed Project route approaches the Champlain Canal in Whitehall, NY where Lock C12 is located and exits the water. Upon exiting the water, the proposed Project route follows the Canadian Pacific Railway (CP) railroad right-of-way.

Based on ongoing correspondence and coordination with the NYSCC and NYSOGS, CHPEI is currently evaluating two potential routes between Whitehall, NY and Fort Edward, NY. For Option #1, the Project route would be buried underground along the CP railroad right-of-way located west of the Champlain Canal between Whitehall, NY and Fort Edward, NY. For Option #2, the Project route would be buried within the Champlain Canal between Whitehall, NY and Fort Edward with the exception of short underground sections along the CP railroad right-of-way to bypass Locks C12, C11, and C-9 (there is no C-10).

South of Fort Edward, the proposed Project route continues along the existing railroad right-of-way, around Albany, NY until meeting up with the Hudson River in the Town of Coeymans, NY. Along this 70-mile stretch of the proposed Project route, the HVDC cables will be buried underground within the existing railroad right-of-way.

Upon entering the Hudson River in Coeymans, NY, the HVDC cables will be buried within the Hudson River for 118 miles until they reach the City of Yonkers. The HVDC cables terminate at a converter station to be located in Yonkers, New York. From the Yonkers HVDC Converter Station, two 345-kV HVAC circuits will enter the Hudson River and travel south through the Harlem River into the East River. These circuits will interconnect with Consolidated Edison's distribution system at either of two points of interconnection. CHPEI's preferred point of interconnection with Consolidated Edison is at a substation currently under development by the New York Power Authority near the former site of the Charles Poletti Power Project in Astoria, Queens County (approximately 16.2 miles from the Yonkers converter station). Alternatively, these circuits could connect to Consolidated Edison's Sherman Creek substation, which is located near the intersection of West 201st Street and 9th Street in the Borough of Manhattan (approximately 6.6 miles from the Yonkers converter station). For the purpose of this analysis, only the Astoria Substation will be discussed as the POI for the Project. The proposed Project route extends approximately 370 miles from the Hertel substation near Montreal, Canada to the Astoria Substation in Queens County, New York.

The proposed Project Route as well as alternative routes discussed in this evaluation are shown in Figure 2-1.



CHAMPLAIN HUDSON EXPRESS ROUTE PROPOSED PROJECT & ALTERNATIVES CONSIDERED

General Location Map

Legend

- Converter Station
- Substation
- Buried Railroad Corridor Alternative Route
- Central NY Overhead Transmission Corridor Alternative
- Proposed Preferred Route

N

Sheet 1 of 1

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Source Data:ESRI World Topo 2009;

3.0 Alternative Land Routes

During the process of developing the proposed Project, alternatives were evaluated to determine their feasibility, consistency with the Project's purpose and need, and their overall impacts. A detailed analysis was completed for two overland routes located primarily in New York: a) routing an overhead HVDC transmission system along existing transmission corridors through Central New York, and b) burying the cables within existing railroad corridors. A description of these two alternative routes, which were both ultimately eliminated from further consideration, is provided below. The proposed Project route as well as the alternative routes discussed in this evaluation are shown in Figure 2-1.

It should be noted that CHPEI also considered an overland alternative that would have utilized existing roadway corridors between Canada with New York City. In order to avoid HVDC cable installation along corridors that intersect numerous other roadways and other developed areas (such as neighborhoods and cities), CHPEI focused its evaluation on major highway routes extending through New York (e.g., Interstate I-87), to the extent feasible. However, this alternative was eliminated from consideration on the basis of current policies of New York State prohibiting linear co-location of utility facilities, other than telecommunications, with the highway right-of-way unless an exception is granted.

3.1 Overhead HVDC Transmission System Alternative

3.1.1 Overhead HVDC Transmission System Alternative Route Siting Analysis

During this siting analysis, CHPEI evaluated the existing transmission system corridors linking Montreal, Canada with New York City. As part of this analysis, an existing (but not continuous) transmission corridor was identified that currently extends north to south along the eastern portions of New York State, to the west of Lake Champlain. However, there are no significant transmission line corridors between the Lake Placid substation and the Barton Brook substation within the Adirondack Park and so this approach would require construction of a new transmission line right-of-way through the Adirondack Park. State owned lands in the Adirondack Park are designated as "Forest Preserve" and are protected by Article XIV of the

New York State Constitution, which prohibits the removal or destruction of timber and forbids the lease, sale, or exchange of such lands. Siting the route along existing 115-kV transmission line rights-of-way within the Adirondack Park would require additional clearing and construction of an entirely new right-of-way. Since proceeding with this alternative would likely require construction of a portion of the Project on Forest Preserve lands, this alternative was eliminated from further consideration.

Another existing (and continuous) transmission line corridor was identified by CHPEI, which extends through central New York (along the western boundary of the Adirondack Park) and connects into New York City. CHPEI further evaluated the economic and environmental constraints and impacts, as well as the practicality of this alternative route, which are discussed herein.

3.1.2 Alternative Route Description

CHPEI evaluated a potential HVDC transmission system that would utilize existing utility rights-of-way extending between Montreal, Canada, and the New York City region. From Montreal, the transmission line would follow an existing 765-kV transmission line southwest toward the substation in Massena, New York. This alternative would then extend south along an existing 765-kV transmission line corridor past NYPA's substation in Marcy. From Marcy, the route would be sited along a 345-kV transmission corridor continuing toward the Pleasant Valley substation in Dutchess County, New York.

The HVDC transmission system would continue south along a 345-kV transmission line corridor past the Pleasant Valley and Millwood West Substations into a converter station located in Yonkers, NY. From the converter station in Yonkers, NY, AC cables would follow the 345-kV transmission line corridor past the Sprain Brook, Dunwoode, Mott Haven, and Hell Gate Substations, across the East River and connect into electric grid at the Astoria Substation. The total length of the Central New York Overhead Transmission Corridor Alternative Route is approximately 438 miles from the Hertel substation near Montreal, Canada, to the Astoria Substation in Queens County, New York.

3.1.3 Alternative Route Technology and Construction

This overhead transmission system alternative would utilize a bipolar configuration, consisting of two conductors per pole (one positive and one negative) and a ground wire. The systems would be designed to operate at a nominal voltage of ±345-kV HVDC. Several different transmission tower configurations may be utilized for overhead transmission lines. In general, the potential transmission tower types can be defined as "lattice" or "monopole" designs. The widely used lattice towers are constructed of galvanized steel and are assembled on site. Lattice towers have a relatively wide base, and their design requires greater clearance along rights-of-way, making them most suitable for areas where the visual/aesthetic impacts of tower installation are not a significant concern and to locations where adequate right-of-way easements can be acquired. Monopole towers have a single-shaft, tubular structure. Because of their smaller footprint, monopole towers are well-suited to right-of-way locations where space is limited. Overall, monopole towers are less obtrusive and offer aesthetic benefits over conventional lattice tower designs. Notwithstanding these benefits, monopole towers can be cost prohibitive, and their use would be expect to be limited to those circumstances where there is insufficient space for the lattice tower structure.

The specific height and design of each monopole or lattice tower would be determined by the angle of the conductor bundles, the span between towers, and the topography. In general, the lattice or monopole steel support structures would be expected to vary from approximately 65 to 135 feet in height. Spans would range from 600 to 700 feet between monopole towers and 800 to 1,000 feet between lattice towers.

It is anticipated that the existing transmission line owner would not agree to allow the Project's transmission infrastructure within their rights-of-way or on their towers. Therefore, based on similar proposed HVDC overhead transmission systems, the construction of a new 345-kV line would require a 60 to 150 feet expansion of the existing rights-of-way.

Land acquisitions and vegetation removal would also be required to facilitate a construction work area and provide adequate clearance for new conductors. The transmission line clearing for construction purposes is dependent on the type of tower, topography, span, location, existing utility rights-of-way, and other factors. The precise rights-of-way would vary along sections of the lines. Vegetation-clearing activities along the rights-of-way may include cutting, grubbing, or other mechanized/hand-clearing techniques. In addition to this transmission line right-of-way, “danger trees” that could potentially damage the conductors would be trimmed, topped, or removed adjacent to the rights-of-way. Vegetation management practices would continue after construction to ensure that the rights-of-way are maintained and that trees posing a threat of danger to the line are eliminated.

Access roads, lay-down areas, wire-pulling sites, and turnaround areas would also be required along the transmission line to facilitate construction equipment and vehicles. These areas would need to be cleared of vegetation, and additional material may be deposited to ensure that access roads remain passable throughout construction. Trenching may also be necessary along the margins of access roads to avoid rutting.

Each transmission tower location would require a concrete foundation to ensure structural stability of the towers. The specific foundation requirements would be dependent on the geotechnical conditions at each tower location. Foundation size and depth would be decided based on the type of tower structure, load bearing capacity of soils, and other factors. For installation in areas of rock outcroppings, anchor bolts may be installed and a concrete pad poured over and around these anchors. At other locations, steel caissons may be necessary to create a dry work area that will allow concrete to be poured. Combinations of these techniques may be utilized to install foundations in areas where rock is encountered below grade.

3.1.4 Alternative Route Siting Constraints

The Central New York Overhead Transmission Corridor Alternative Route intersects a small portion of land within the western portion of the Adirondack Park in Lewis County and Saint Lawrence County. Based on mapped Forest Preserve within the Adirondack Park, this alternative route is located in the immediate vicinity of (and potentially within) land designated as Forest Preserve. Although, the Central New York Overhead Transmission Corridor Alternative Route extends alongside an existing transmission corridor, it is likely that the current transmission corridor owners would prohibit the use of their transmission towers and rights-of-way by the CHPE Project. Therefore, new transmission line corridors requiring extensive land acquisition and clearing would be necessary. It is anticipated that land acquisition and clearing within the Adirondack Park would pose problems for those portions of the project located on

Forest Preserve lands. In addition, land acquisition particularly within urban (heavily developed) areas such as New York City may be infeasible due to lack of available real estate as well as costs associated with real estate acquisitions within these areas. Lastly, the Central New York Overhead Transmission Corridor Alternative Route is considerably longer (68 miles) than the proposed Project route.

It is worth noting that the environmental impacts of an HVDC transmission system following a similar alignment were recently evaluated in association with the New York Regional Interconnect Project (NYRI). Among other reasons, as a result of the analysis of environmental impacts and strong public opposition to NYRI's overhead line, the project was ultimately abandoned. Based on the NYRI example, the discussion above and the environmental analysis completed below, CHPEI considered this alternative to be impracticable.

3.2 Buried HVDC Transmission System Alternative

3.2.1 Alternative Route Description

CHPEI evaluated an alternative route that would utilize existing railroad corridors linking upstate New York with New York City. CHPEI identified a continuous railroad corridor along the eastern portion of New York. The Buried Railroad Corridor Alternative Route follows the CP railroad lines extending along the western shore of Lake Champlain and the Champlain Canal from Canada to Schenectady. In Schenectady, the CP railroad continues west and intersects with the CSX railroad lines. The Alternative Route follows the CSX railroad and continues south along the western shore of the Hudson River toward New York City. In the vicinity of Poughkeepsie, NY where the Hudson River narrows, the Buried Railroad Corridor Alternative Route would exit the CSX railroad right-of-way and cross beneath the Hudson River to the eastern shore. The HVDC transmission system would follow the Metropolitan Transportation Authority Metro-North Commuter Railroad Co. (MNCR) right-of-way to the converter station in Yonkers, NY. From Yonkers, NY, the AC cables would continue south along the MNCR right-of-way adjacent to the Hudson River and Harlem River before entering the East River to connect into the electric grid at the Astoria Substation in Queens County, NY. The Buried Railroad Corridor Alternative Route is approximately 365 miles from the Hertel substation near Montreal, Canada, to the Astoria Substation in Queens County, NY.

3.2.2 Alternative Route Technology and Construction

CHPEI considered the construction of a buried HVAC transmission system for the Project. However, HVAC cables have a steady-state charging current and generate considerable heat. Therefore, burial of HVAC lines would require supplementary cooling, making HVAC unsuitable for long underground lines. These technological limits of HVAC systems do not permit underwater/underground transmission over the significant distances required for this Project. A buried HVAC transmission system alternative is therefore considered infeasible; the CHPE Project will utilize HVDC cable technology.

The Buried Railroad Corridor Alterative Route will utilize XLPE HVDC cable technology. The XLPE land cables are solid state cables that contain no fluid. Each land cable will typically be approximately 4 inches in diameter and weigh approximately 29 kg/m. The XLPE cables are made up of several layers consisting of a conductor, insulation, sheath, and outer serving. At average burial depths (3 feet), the maximum ambient temperature for the cable buried in the soil at depth is 20°C.

A minimum separation distance is required from the rails to the cables. For example, CP requires a minimum separation of 10 feet from the centerline of the outermost track to the cable trench, and CSX requires a minimum separation of 25 feet from the centerline of the outermost track to the cable trench. The typical and preferred layout is to have one bipole (two cables) installed on one side of the railroad tracks. With this layout, the limits of construction activity extend 15 feet beyond the required minimum setback of the railroads. This 15-foot area will include the area needed for excavation of the trench, installation of erosion and sediment control measures, installation of the two cables, and stockpiling of excavated material. There are areas that will require different configuration and pose additional engineering challenges, such as steep slopes, environmentally sensitive areas, and existing structures.

The construction methods for installing underground HVDC cables are described in the Application and it is assumed that for the Buried Railroad Corridor Alternative Route the same general construction sequence for cable installation would be followed: a) initial clearing operations (where necessary) and storm water and erosion control installation; b) trench excavation; c) cable installation; d) backfilling; and e) restoration and revegetation. The typical trench will be up to 9 feet wide at the top and approximately 3 feet deep to allow for the proper depth and separation required for the burial of the cables. If shallow bedrock is encountered, the rock will be removed by the most suitable technique given relative hardness, fracture susceptibility, and expected volume of the material.

During cable installation, it is anticipated that the majority of supplies and equipment will be transported along the cable route via the railroad. However, it will also be necessary, in certain instances or for certain components of the work, for vehicles to arrive and depart from work areas via local roadways. Workers may arrive at contractor yards or the right-of-way in pickup trucks, supplies may be delivered directly to the site, and equipment, such as dewatering pumps, generators, or excavators, may also need to access the site via local roads.

Subsequent to laying the cables, the trenches will be backfilled with low thermal resistivity material. Because the operation of the cables results in the generation of heat, and heat reduces the electrical conductivity of the cables, it is important to backfill with this material to prevent heat from one cable affecting a nearby cable. There will be a protective concrete cover or a layer of weak concrete directly above the low thermal resistive backfill material. The whole assembly will have a marker tape placed 1 to 2 feet above the cables. The top of the trench may be slightly crowned to compensate for settling. In wetland areas, the segregated topsoil will be spread across the trench area.

In areas of wetlands or perched water tables, trench plugs or other methods to prevent draining of wetlands or surface waters down the trench will be used. In areas of wetland soils, the organic surface layer will be backfilled over the subsoil backfill to reestablish an adequate soil profile for wetland restoration objectives. Another component of the backfilling process that will be assessed and addressed is soil compaction. Soil compaction is a small concern if the trenching, stockpiling, cable installation, and backfilling are conducted from the railroad, as heavy equipment operation on the ground surface along the cable trenches will be minimal. In addition, location of the construction corridor within the railroad right-of-way (and not on adjacent fields or agricultural lands) further reduces the likelihood of soil compaction concerns.

A cleanup crew will complete the restoration and revegetation of the rights-of-way and temporary construction workspace. In conjunction with backfilling operations, any woody material and construction debris will be removed from the rights-of-way. The temporary construction area will be seeded with an approved seed mix for the area and allowed to revegetate naturally.

3.2.3 Alternative Route Siting Constraints

An evaluation of the feasibility of the Buried Railroad Corridor Alternative Route indentified significant siting constraints. First, the additional costs and labor expenses associated with this extensive overland construction make this alternative financially impractical. Preliminary estimates showed that the installation costs and schedule for burying the cables along railroad rights-of-way would, on average, be approximately twice those of installation within waterways. The additional costs are due to an increased number of cable splices and horizontal direction drill locations. The Buried Railroad Corridor Alternative Route would also require CHPEI to acquire land for additional width along the existing rights-of-way to facilitate construction and line maintenance in urban areas. Current real estate prices, residential, and commercial development in the New York City area make land acquisitions extremely difficult. In many areas along the MNCR right-of-way, the railroad is closely bordered by roadways, neighborhoods, and waterways that would inhibit or prevent attempts to widen the corridor to the necessary width to permit installation and maintenance of buried transmission lines. The Buried Railroad Corridor Alternative Route extends through the eastern portion of the Adirondack Park from Schuyler Falls to Whitehall. It is anticipated that cable installation within the Adirondack Park would pose problems for those portions of the project, located within the Forest Preserve. For these reasons, CHPEI considered the Buried Railroad Corridor Alternative Route as not a viable alternative.

4.0 Comparison of Alternatives Considered

CHPEI evaluated the environmental impacts for the land-based alternatives considered to the proposed Project. Due to the scale of the Project, it was not possible to obtain detailed field information (e.g., field survey data) for the alternatives; therefore, the evaluations are based on a review of readily available desktop information. The resources evaluated include the following:

- Geologic resources and soils,

- Terrestrial biological resources,
- Aquatic biological resources,
- Wetlands and water resources,
- Cultural resources,
- Land use,
- Visual resources/aesthetics.

4.1 Geologic Resources and Soils

4.1.1 Proposed Project

The proposed Project will be sited along the route within areas of favorable geology for the appropriate installation and burial of the cables. Favorable geology for the submarine portions of the proposed Project consists of sand, small gravel, silty sand, or gravelly sand. Cable installation techniques utilized for the submarine portions of the proposed Project have been selected to minimize sediment suspension and/or transport. At this time, only short sections of the proposed Project's submarine route are anticipated to require dredging to achieve appropriate burial of the cable (i.e., areas where the cable must be located in the designated navigation channels). However, it is anticipated that the areas where dredging may be required for cable installation are previously disturbed areas that routinely undergo dredging. Other than the aforementioned areas where dredging is required for cable installation, no other sediment removal or dumping is anticipated. In areas where the submarine cables encounter bedrock, the cables will be laid on top of the bedrock with protective coverings; it is not anticipated that the bedrock will be blasted/removed for cable installation.

For the overland segments of the proposed Project, cable installation and burial will likely require land clearing, including soil excavation to bury the cables within trenches, which are up to 9 feet wide at the surface and approximately 3.5 feet deep. Erosion controls will be in place to minimize stormwater run-off, and tractor and disc harrow (or similar) will be used where soil compaction has occurred to prepare the soil for restoration. Gullied, rilled, or rough sites will be smoothed and shaped to permit the use of equipment for plantings. Upon completion of the installation of the underground transmission cable, the surface of the right-of-way disturbed by construction activities will be filled with the native soil/topsoil and graded to match the original topographic contours and to be compatible with surrounding drainage patterns, except at those locations where permanent changes in drainage will be required to prevent erosion that could lead to possible exposure of the cable. In areas along the overland portions of the proposed Project route where bedrock is encountered at or close to the surface and cannot be avoided, blasting will be required to appropriately install (bury) and protect the HVDC cables.

Both the submarine and land HVDC cables are solid-state and do not contain any fluids, eliminating any potential for soil or sediment contamination from the cables.

4.1.2 Overhead HVDC Transmission System Alternative

The Central New York Overhead Transmission Corridor Alternative Route would utilize existing transmission corridors extending from Montreal, Canada to the New York City region. It is anticipated that the Project's 345-kV transmission line would require expansion of the existing transmission line corridors, new transmission tower construction, and new access road construction. Therefore, land clearing and tower erection activities would be necessary (as described in Section 3.1.3), which would impact geologic resources and soils.

4.1.3 Buried HVDC Transmission System Alternative

The Buried Railroad Corridor Alternative Route considers a route utilizing existing railroad corridors extending between Montreal, Canada and the New York City region. The HVDC cables will be buried underground within or immediately adjacent to the existing corridors identified above in Section 3.2.1, using construction techniques described in Section 3.2.2 and the Application. In comparison to the proposed Project's overland portion of the route (74 miles), the Buried Railroad Corridor Alternative Route has 365 miles of overland route in which the HVDC cables will be buried. The Buried Railroad Corridor Alternative Route will require access for construction equipment consisting of trucks, excavators, and other machinery to install/bury the HVDC cables within trenches along the overland route. Installation equipment will be utilized in a manner to avoid or minimize erosion and compaction, but it is anticipated that the impacts to geologic resources and soils will be greater with the Buried Railroad Corridor Alternative Route than the proposed Project.

Where large areas of bedrock at or close to the surface are encountered along the route and cannot be avoided, blasting will be necessary to appropriately install/bury and protect the HVDC cables. At this time, specific areas where this may be necessary are not known.

4.2 Terrestrial Biological Resources

This section provides a description of impacts of the proposed Project and alternatives considered on upland vegetation cover types, terrestrial wildlife, and significant natural communities.

4.2.1 Proposed Project

The proposed Project route is buried within waterways, to the greatest extent feasible from Montreal, Canada to New York City. The proposed Project also includes a terrestrial bypass route to avoid cable installation within the Champlain Canal from Whitehall, NY to Fort Edward, NY (Option 1) as well as a 70 mile terrestrial bypass route in Washington, Saratoga, Schenectady, and Albany Counties, to avoid interference with activities associated with the Upper Hudson River PCB Dredging Project. In these terrestrial areas, the transmission cables will be buried via trenching or HDD depending on location and the resources identified in the vicinity of the cables. There will also be a converter station in the New York City region where very limited vegetative clearing may occur.

The proposed Project has been designed to minimize impacts to terrestrial biological resources, to the greatest extent possible, by routing the terrestrial underground portions of the Project in previously disturbed areas primarily along existing railroad rights-of-way. In areas where forested communities occur, routing the Project along the railroad right-of-way reduces the amount of impact to the canopy vegetation and avoids new fragmentation of forested habitats.

Vegetation clearing and excavation activities within the construction corridor will result in temporary impacts to terrestrial resources along the proposed Project overland route. Impacts are anticipated to be minor given that most equipment staging and access will be from the railroad track or from the access road adjacent to the track. As stated above, since the terrestrial portions will occur in rights-of-way, most of the vegetation that will be impacted along the underground portions of the proposed Project corridor consists of previously disturbed herbaceous and/or shrubby cover within the existing railroad rights-of-way. Herbaceous vegetation and successional shrubs within the areas impacted by construction are expected to recover quickly following restoration and stabilization of construction corridor.

Impacts to terrestrial wildlife along the underground transmission cable corridor are expected to be temporary. During construction, wildlife may be disturbed by noise, vegetation clearing, lighting, and construction activities within the impact corridor and any additional work spaces. Mobile animals are expected to be temporarily displaced from the construction area and immediately adjacent areas, moving into similar habitats nearby for the duration of construction. These species would then return to the area once construction and restoration of disturbed areas are completed. Smaller and less mobile organisms, such as turtles, amphibians, and small mammals, could experience direct mortality from vehicles and equipment within the construction corridor. CHPEI has initiated discussions with New York Natural Heritage Program of the New York State Department of Environmental Conservation and U.S. Fish & Wildlife Service for additional information and recommendations relating to wildlife impacts during construction and operation of the Project.

Upon completion of construction activities, CHPEI will conduct initial restoration, including soil stabilization and temporary seeding of disturbed areas. Once erosion control vegetation cover has been established, the construction corridor will be allowed to re-vegetate naturally.

During operation of the proposed Project, activities will be restricted to vegetation clearing on an as-needed basis to conduct repairs or maintenance along the transmission cables and/or selective cutting to prevent the establishment of large trees directly over the cables. The use of herbicides for construction and maintenance of the cables is not anticipated at this time.

As the terrestrial components of the proposed Project are much shorter in distance than the proposed alternatives, and the area of impact from cable installation is relatively small, the terrestrial impacts are significantly less environmentally damaging to terrestrial resources than any of the proposed build alternatives.

4.2.2 Overhead HVDC Transmission System Alternative

The Central New York Overhead Transmission Corridor Alternative Route would exclusively utilize above-ground project components and is therefore expected to have the highest level of impact to terrestrial biological resources. Although utilizing existing transmission corridors, the Central New York Overhead Transmission Corridor Alternative Route would require additional land-clearing activities along the existing transmission rights-of-way because it is anticipated that right-of-way expansion would be required. Additionally, transmission capacity, particularly in New York State, is old and is at or near capacity; therefore, it is likely that the existing transmission line corridors are not suitable for siting a new 345-kV transmission line on the existing towers. Based on the need to expand existing transmission rights-of-way for a new 345-kV line, land clearing for construction, access roads, and staging areas, it is anticipated permanent changes in vegetation cover type would result.

4.2.3 Buried Overland HVDC Transmission System Alternative

The Buried Railroad Corridor Alternative Route would be sited primarily within previously disturbed areas. However, additional vegetation clearing is anticipated to expand the existing rights-of-way, construct new access roads, and accommodate cable installation areas along the existing corridors identified for the Buried Railroad Corridor Alternative Route.

The Buried Railroad Corridor Alternative Route is expected to have similar short-term impacts as the Project in terms of terrestrial resources. However, land-clearing activities for right-of-way expansion and construction of new access roads would result in a permanent change in cover type for wetland and upland areas. Additionally, as stated above, the total acreage of disturbed land will increase significantly under this alternative compared to the proposed Project.

4.3 Wetlands and Water Resources

4.3.1 Proposed Project

The proposed Project route is primarily sited within the waterways that comprise Lake Champlain, (potentially the Champlain Canal - Option 2), the Hudson River, the Harlem River, and the East River. These freshwater and saltwater waterbodies include deepwater habitats that are permanently inundated. Additionally, these waterbodies provide transitional environments between terrestrial and aquatic systems that support a unique variety of plant and animal types.

The submarine cables will primarily be installed within waterbodies linking Lake Champlain with the East River. Wetlands within the proposed Project submarine cable route are generally classified as riverine, lacustrine, estuarine, or marine unconsolidated bottoms. Therefore, activities associated with proposed Project construction have the potential to impact wetlands and deep water habitats. The majority of the proposed Project submarine route is either riverine or tidal (Hudson River, Harlem River, and East River), where the existing water quality typically experiences periods of naturally occurring increases in suspended sediments (i.e., storm events).

As discussed in the Application, the majority of the submarine cable route will be installed/buried to a depth of approximately 3-5 feet using water-jetting techniques, which minimize sediment suspension and/or transport. Minimization of sediment suspension will avoid or minimize associated impacts to water quality associated with desorbed sediment contamination or turbidity. The water-jetting process allows sediments to backfill the trench, and it is anticipated that animal and plant communities in unconsolidated bottom sediments will quickly re-colonize the area. No permanent or long-term impacts on water quality from submarine cable installation with water jetting are expected. In addition, no impacts will occur during cable operation unless cable repair is required.

For sections where water-jetting is not possible for cable installation/burial, “plowing” may be necessary. For the plowing technique, the plow is tethered to a surface support vessel, which tows the plow along the lake/river bed. A trench, approximately 2 ft wide and 3-5 ft deep, is made for the cable by the plow and the cable settles into the trench. Usually, the bottom sediment is allowed to naturally backfill the trench over the cable by slumping of the trench walls, wave action, or bed load transport of sediments. Where it has been determined that the sediments are not likely to result in adequate backfill over the cable, a backfill plow can be used which employs horizontal blades that capture the sediment pushed off to the sides during plowing and pulls it back into the trench over the cable. Similar to the methods described for water-jetting, no new/non-native sediment or fill material will be deposited during submarine cable installation using plowing techniques. Additionally, unless otherwise required, sediments will not be removed from the waterbody for disposal. Therefore, submarine cable installation via plowing is considered to have a temporary impact on wetlands and waters of the U.S., limited to the immediate area and duration of the actual submarine cable installation.

At locations where the transmission cables have been sited within or will cross maintained navigation channels, conventional drilling will likely be required to adhere to specific cable burial depths required by regulatory agencies. In these locations, either a clam-shell dredge or barge-mounted excavator will be used to pre-dredge a trench into which the cable will be laid, with the trench spoil being brought to the surface and placed on barges either for re-use as backfill or for approved disposal. The cables will be laid in the excavated trench and the clam-shell dredge or excavator will place the appropriate amount of sediment back into the trench for cable protection. The removal of dredge materials may impact wetlands and/or waters of the U.S. However, as these navigation channels periodically undergo maintenance dredging and/or deepening, the impacts from cable installation activities performed within these pre-disturbed areas are expected to be consistent with previously approved activities causing similar impacts that have occurred or impacts from future activities to be approved, that may impact these wetlands/waters of the U.S.

In limited areas along the proposed submarine route, the necessary burial depths for the protection of the cables may not be achievable due to geology (i.e., areas of bedrock) or existing submerged infrastructure crossings (i.e., other electric cables, natural gas pipelines, etc.). There may also be areas where regulatory agencies do not want the cables to be buried. In these instances, the cables will be laid atop the lake/river bottom and will be covered with sloping stone rip-rap or articulated concrete mats. Articulated concrete mats are typically made of small pre-formed blocks of concrete that are interconnected by cables or synthetic ropes in a two-dimensional grid. It is presumed that the use of rip-rap or concrete mattresses will represent a permanent impact to wetlands and waters of the United States, although this change in conditions will be minimal for areas where bedrock or similar hard bottom are present.

The overland portions of the proposed Project route include a terrestrial bypass route to avoid cable installation within the Champlain Canal from Whitehall, NY to Fort Edward, NY (Option

1) as well as a 70 mile terrestrial bypass route in Washington, Saratoga, Schenectady, and Albany Counties, to avoid interference with activities associated with the Upper Hudson River PCB Dredging Project. At each waterbody exit and entry location, there is the potential for wetland impacts, particularly within freshwater floodplains and estuarine intertidal zones. However, HDD cable installation techniques will be used to avoid wetland impacts to the shoreline transitional areas. The construction sequence along the proposed Project overland routes will typically consist of site preparation and vegetation clearing within the construction corridor (where necessary), followed by the excavation of a trench approximately 3.5 feet deep and up to 9 feet wide at the surface. Erosion and sediment controls will be installed prior to construction.

Construction and operation of the proposed Project will result in primarily temporary impacts to wetlands and waterbodies along the terrestrial portions of the proposed Project route. This may include both direct impacts, where the edge of the cleared construction corridor traverses a wetland or riparian area, and indirect impacts from vegetation clearing and ground disturbance in adjacent uplands.

Waterbody crossings along the proposed Project railroad rights-of-way will typically be constructed by trenching across the waterbody, followed by the restoration of the bed and banks. In some cases, large waterbodies may be crossed by the HDD method, which allows installation without trenching or other surface disturbance. Alternately, where a large waterbody is crossed by a railroad bridge, the cables may be placed aboveground along the railroad trestle.

During construction, potential short-term effects on water quality may be caused by localized increases in turbidity and downstream sedimentation resulting from trenching and disturbance within the waterbody. Erosion and sediment controls will be installed / utilized to avoid or minimize sediment runoff and CPHEI will strive to comply with water quality standards.

Some disturbance or clearing of riparian vegetation adjacent to waterbodies within the construction corridor may be required to conduct trenching and cable installation activities. Clearing of vegetation along stream banks has the potential to reduce the bank stability and increase erosion. These impacts will be temporary and will be minimized through the use of erosion control measures and by restoring, stabilizing, and seeding stream banks as soon as possible once construction is completed.

4.3.2 Overhead HVDC Transmission System Alternative

As stated above, it is not anticipated that existing utility line owners would agree to allow the Project's infrastructure within their rights-of-way or on their towers. Therefore, installation of the Project's 345-kV transmission line along the Central New York Overhead Transmission Corridor Alternative Route would require expansion of the corridors and siting and construction of new transmission towers and access roads. Based on the aforementioned information, it is anticipated that there will be unavoidable impacts to wetlands, water resources, and vernal pools for the Central New York Overhead Transmission Corridor Alternative Route caused by the land clearing, new tower siting and construction, and access road construction activities.

As indicated by other overhead transmission line projects, the amount of incremental clearing along existing transmission lines will depend on the existing transmission line right-of-way width and agreements with the existing right-of-way owners regarding the required separation distances between existing facilities and new facilities, but is typically expected to require 60 to 150 feet of vegetation clearing. Vegetative clearing is also anticipated for construction preparation at structure locations and for access roads.

During construction of new transmission tower foundations, wetland impacts are likely from soil erosion, siltation, and sedimentation. Wetland impacts may also be associated with wetland fill in those areas where the structure foundation may extend into a wetland. For example, where tower foundations cannot avoid wetlands, the tower structures will require foundation excavation with dimensions of ranging from 400 $feet^3$ to greater than 2,000 $feet^3$, depending on the required tower design needed for that area.

The vegetation clearing required for the Project's 345-kV transmission line is expected to significantly impact wetland resources located in the vicinity of the clearing. Construction of access roads in areas that cannot avoid wetlands will include wetland filling resulting in a permanent impact to wetlands. Additionally, for areas where transmission tower siting cannot avoid wetland areas, the construction activities associated with the tower foundation include excavation and fill (including concrete), which represent a permanent impact to wetlands.

4.3.3 Buried Overland HVDC Transmission System Alternative

Cable installation along the Buried Railroad Corridor Alternative Route would primarily utilize the same methodologies as the proposed Project’s overland portions, although on a greater scale due to the greater lengths of overland cable installation for the alternative route. The Buried Railroad Corridor Alternative Route is located in the railroad corridors for approximately 365 miles (Montreal to New York City), compared to the overland portion of the proposed Project at approximately 74 miles in total length. Because the Buried Railroad Corridor Alternative Route is proposed to be located within the existing railroad right-of-way, there is likely less flexibility to route the cable around designated wetland resources in order to remain within the (at times) narrow railroad right-of-way. In addition to potential wetland impacts associated with siting and installing the Project’s cables, significant equipment lay-down areas will be needed for the Buried Railroad Corridor Alternative Route. These lay-down areas will be used to store large volumes of cable and equipment, which will also require access for large machinery to transport the cable and equipment supplies.

Wetland delineations along approximately two-thirds of the proposed Project overland route were conducted in the fall of 2009 and indicated that the wetlands identified along the railroad rights-of-way were often associated with man-made drainage systems. Because the Buried Railroad Corridor Alternative Route is primarily sited within previously disturbed, existing corridors, it is anticipated that numerous wetlands within these man-made drainage systems may be identified along the railroad rights-of-way, resulting in significant short-term impacts.

4.3.4 Summary and Comparison of Wetland Impacts

Table 4-3 presents the acreage of wetlands intersected by the preferred and alternative routes based on mapping provided by the U.S. Fish & Wildlife Service's National Wetland Inventory and the New York State Department of Environmental Conservation. The acreage estimates provided are based only on readily available desk-top information, with no field delineations or field verification studies. It is assumed therefore that additional wetland areas would be identified during field delineation studies performed on the terrestrial portions of any route, with the greatest increases expected for the Central New York Overhead Transmission Corridor Alternative Route and the Buried Railroad Corridor Alternative Route due to the length of their upland segments (438 miles and 365 miles, respectively). Areas designated as NYSDEC and NWI Wetlands along the Proposed Project Route, the Central New York Overhead Transmission Corridor Alternative Route, and the Buried Railroad Corridor Alternative Route are shown in Attachment A,B, and C, respectively.

Table 4-3. Wetland Acreages Intersected by the Proposed & Alternative Routes

Cable Route		**Proposed Route (Option 1)[1]**		**Proposed Route (Option 2)[2]**		**Buried Railroad Corridor Alternative Route**	**Central NY Overhead Transmission Corridor Alternative Route**
		Submarine Portion	Railroad Portion	Submarine Portion	Railroad Portion		
Corridor Width (feet)[3]		6	10	6	10	10	105
New York Portion of Route							
NWI Wetlands in NY[4] (acres)	Estuarine and Marine Deepwater	71.22	-	71.22	-	16.72	7.19
	Estuarine and Marine Wetland	-	-	-	-	1.25	-
	Forested/Shrub; Freshwater Emergent; Pond	0.61	3.66	0.74	1.78	20.09	245.47
	Lakes; Riverine	114.54	0.91	126.99	0.40	3.95	50.04
Total NWI Wetlands in NY		**190.94**		**201.13**		**42.01**	**302.70**
NYSDEC Wetlands in NY[5] (acres)	Freshwater Wetlands[6]	1.01	1.46	1.01	1.40	19.03	200.64
Total NYSDEC Wetlands in NY		**2.47**		**2.41**		**19.03**	**200.64**

[1] Proposed Route Option 1 follows the CP Railroad right-of-way between Whitehall, NY and Dunham Basin, thereby completing avoiding the Champlain Canal.
[2] Proposed Route Option 2 is sited within the Champlain Canal between Whitehall, NY and Dunham Basin with short terrestrial bypass routes along the CP Railroad right-of-way to circumvent locks C12, C11, and C9.
[3] Corridor widths represent an estimated width of direct wetland impacts for each route based on cable installation methods. The Overhead Alternative Route corridor width may range from 60 to 150 ft; therefore, 105 ft represents the average.
[4] No NWI wetland data is available within the Adirondack Park.
[5] No NYSDEC wetland data is available within the Adirondack Park.

[6] NYSDEC mapped wetlands include freshwater wetlands which are lands and waters of the state which meet the definition provided in section 24-0107(l) of the act and have an area of at least 12.4 acres, or if smaller, have unusual local importance as determined by the commissioner pursuant to section 24-0301(l) of the act.

4.4 Cultural Resources

4.4.1 Proposed Project

The proposed Project may have the potential to affect archaeological sites, historic properties, and shipwrecks, including those resources listed in or eligible for inclusion in the National Register of Historic Places (National Register). The proposed transmission cable corridor will be located along historically significant waterways in New York that have been designated as archaeologically sensitive by the New York State Office of Parks, Recreation, and Historic Preservation (OPRHP). This corridor follows sections of waterways where historic shipwrecks have been reported and may potentially include deposits associated with adjacent archaeological and historic sites located along the shorelines. To the extent practicable, existing shipwreck data, archaeological site information, and other resource data have been reviewed to site the transmission cables in locations that will not directly affect these resources. However, there may be instances along the proposed Project route where avoidance may not be practical and where the transmission cable corridor will intersect with reported historic resources.

Overland sections of the proposed Project route intersect with reported archaeological sites that extend through the railroad right-of-way. Although most of these sites have not been evaluated for inclusion in the National Register, they may potentially meet the criteria for eligibility.

The proposed Project route will also be located in the vicinity of historic buildings and structures, including historic canalways and their associated infrastructure. These historic properties include lock systems along the Champlain Canal (applicable to Option 2), districts that encompass portions of the canal itself, and historic bridges along the Hudson River, Spuyten Duyvil Creek, and the Harlem River. The proposed Project route is also located within National Heritage Areas and New York State Heritage Areas, including the Mohawk Valley Heritage Corridor and the “RiverSpark” (Hudson-Mohawk) Heritage Area.

In general, the Project is unlikely to have a significant effect on standing historic structures within the proposed Project’s vicinity. With the exception of the converter station, the proposed

Project's principal components will be buried and will not have an effect on the viewshed. The converter station will be designed to match the character of the surrounding area and is not expected to have an adverse impact on any historic properties in the vicinity.

In the development of a plan to address the adverse effects of a proposed action on cultural resources, the first and most desirable approach is to maximize the avoidance of impacts in all aspects of a project. Impact avoidance has been incorporated in all major aspects of the Project.

In the first instance, the selection of a submarine cable for the proposed Project avoids many potential impacts that are associated with an overland route. The installation of the cables in existing waterways will significantly reduce the overall number of sites that could potentially be impacted by this Project. Prehistoric and historic period archaeological sites are generally found on landforms suitable for short- or long-term habitation, resource procurement practices, defense, and agriculture. While waterways have served as important transportation routes and economic conduits, most archaeological sites and historic standing structures are located along shorelines or in upland areas. Consequently, the selection of a submarine route avoids impacts to these landforms that have the highest potential for archaeological sites or historic standing structures.

The proposed Project will not require the construction of poles or towers that can mar the viewshed and indirectly affect the integrity and character of historic properties. The installation of submarine cables will also avoid ground disturbance associated with installing towers or poles, including the disturbance caused by construction vehicles and wire-pulling equipment. Additionally, submarine cables do not require vegetation management activities that require clearance along a right-of-way. The ground-disturbance associated with clearing and maintaining a traditional, overhead transmission line right-of-way can cause damage to buried archaeological deposits along the entire right-of-way.

Cable installation methods have been selected to minimize the extent of ground disturbance both above and below waterways. Cable burial using a hydroplow system uses a focused, high-powered water jet to avoid widespread ground-disturbing activities along a majority of the route. Similarly, HDD installation at locations where the cables must enter or exit the water will avoid disturbance to the topmost soil layers that generally have the highest potential to contain archaeological deposits.

The use of a submarine cable provides flexibility in cable siting that permits placement to avoid identified archaeological or historical resources. The preferred approach is to avoid adverse effects to cultural resources by routing the transmission cable around identified historic properties, reported archaeological sites, shipwrecks, and anomalies identified in waterways. To this end, screening studies were incorporated into the siting process to avoid identified resources along the Project's alignment, to the maximum extent practicable.

4.4.2 Overhead HVDC System Alternative

The Central New York Overhead Transmission Corridor Alternative Route requires significant ground-disturbing activities to facilitate installation of support towers, access roads, lay-down areas, wire-pulling sites, and turnaround areas. Additionally, the timber clearing/vegetation management activities associated with construction and maintenance of overhead lines will result in ground disturbance that could adversely affect buried archaeological deposits.

Prehistoric and historic period archaeological sites are generally found on landforms suitable for short- or long-term habitation, resource procurement practices, defense, and agriculture. Therefore, terrestrial construction activities have a higher inherent probability of disturbing archaeological or cultural deposits. Although archaeological studies have been conducted along portions of the rights-of-way associated with the Central New York Overhead Transmission Corridor Alternative Route discussed in this analysis, comprehensive cultural resource studies are lacking for an overwhelming majority of these routes.

Notwithstanding this lack of specific data, professional and amateur archaeologists alike in New York and New England have long recognized that archaeological sites can be found on a variety of landforms. Prehistoric archaeological sites along the upland sections of the Central New York Overhead Transmission Corridor Alternative Route may range from temporary or seasonal campsites to stockaded villages. River valleys and shoreline areas were often centers of prehistoric population, and larger villages are found along drainages and adjacent to shorelines throughout New York State. In many instances, sites found along major drainages include dense, multi-component archaeological deposits, representing prehistoric populations that utilized these locations repeatedly over a span of hundreds or even thousands of years.

Historic period resources are also likely to be prevalent along the Central New York Overhead Transmission Corridor Alternative Route, particularly in dense urban areas. In the Adirondack Mountain region, the remnants of historic period homesteads, logging camps, and hunting camps are found not only near historic roadways, but often in relatively remote or isolated upland areas. In urban areas, dense historic archaeological deposits are common. The Central New York Overhead Transmission Alternative Route will extend through historic towns and cities that have been occupied since the early colonial period. The archaeological sensitivity of these areas is considered high and there is a strong probability that sites will be disturbed during construction of overhead transmission lines.

Overhead transmission towers may also mar the viewshed and adversely affect the integrity and character of historic buildings and structures along the overhead rights-of-way. Whereas construction of buried/submerged transmission lines largely avoids these impacts, overhead transmission lines may affect the historic landscapes and viewsheds that make National Register properties significant.

The Central New York Overhead Transmission Corridor Alternative Route is relatively restricted to existing utility corridors, and therefore lack the same flexibility to avoid historic properties afforded to the proposed Project. Although this alternative primarily utilizes existing corridors, it is anticipated that large sections of the route will require expansion (land clearing) of the existing rights-of-way, as well as new (often taller) transmission towers. In general, the Central New York Overhead Transmission Corridor Alternative Route considered in this analysis has a high potential to adversely affect historic properties, including historic and prehistoric sites, buildings, districts, structures, and individual objects.

4.4.3 Buried Overland HVDC Transmission System Alternative

The Buried Railroad Corridor Alternative Route considered in this analysis is likely to have similar impacts to historic properties as those discussed in Section 4.4.1, above. Similar to the Central New York Overhead Transmission Alternative Route, the Buried Railroad Corridor Alternative Route requires extensive ground disturbance in areas considered archaeologically sensitive for both historic and prehistoric period archaeological resources. The Buried Railroad Alternative Route may have a higher potential to impact archaeological deposits, inasmuch as these corridors often follow transportation networks that have been used since the prehistoric period. Historic communities developed along these arteries across the region, and the probability of impacting historic period archaeological sites is significant.

The Buried Railroad Corridor Alternative Route is relatively restricted to existing utility corridors and railroad rights-of-way and, therefore, lack the same flexibility to avoid historic properties afforded to the proposed Project. While the Buried Railroad Corridor Alternative Route does not include construction of transmission towers that could adversely affect historic resources, the additional ground-disturbing activities associated with this alternative make avoiding buried deposits less practical and therefore increase the potential of adversely affecting cultural resources

4.5 Land Use

4.5.1 Proposed Project

The majority of the proposed Project route is located underwater, with minimal potential impact to public or private property, open space, or any existing or planned land uses. Underwater portions of the proposed Project are not expected to result in any significant impacts to land use, since water-dependent uses, navigation, and other coastal uses will not be affected.

The overland portion of the Project will be constructed primarily within the existing CP and CSX railroad rights-of-way, with a short segment located on lands owned by the New York State Canal Corporation (applicable to Option 2). Along the overland portions of the proposed Project route, impacts to land use have been minimized by routing the Project along existing disturbed railroad rights-of-way, to the extent possible.

The Project does not conflict with existing comprehensive county or town plans or local waterfront revitalization plans in New York.

4.5.2 Overhead HVDC Transmission System Alternative

The Central New York Overhead Transmission Corridor Alternative Route utilizes existing transmission corridors identified between Montreal, Canada and the New York City region.

However, it is assumed that this alternative route would require additional land clearing and widening of the existing corridors, thereby further impacting the existing corridor and potentially impacting nearby land uses. Land use designations are often closely related to the influences and value of the surrounding aesthetics. An overhead transmission line would influence the surrounding aesthetics and may cause changes in land use designations.

4.5.3 Buried Overland HVDC Transmission System Alternative

The land use impacts associated with the Buried Overland HVDC Transmission System Alternative are assumed to be similar to those detailed for the overland portion of the proposed Project.

4.6 Visual Resources/Aesthetics

4.6.1 Proposed Project

Lake Champlain and the Hudson River are highly valued for their scenic character. The proposed Project is designed to have negligible visual impacts. There will be no overhead transmission lines constructed as part of the proposed Project. To the extent possible, CHPEI proposes to bury the transmission cables within existing waterways to minimize visual impacts typically associated with traditional overhead transmission lines. In areas where the transmission cables cannot be buried within waterways, the transmission cables will be buried underground within existing railroad corridors.

Impacts to the visual quality and scenic character of the proposed Project route would be associated with the construction phase of the Project. During the construction phase, various types of marine vessels will be used to install the cable in the waterway portions of the route. HDD and other construction equipment may be used to install the cable along overland sections where the cables cannot be installed in the waterways. Construction equipment will be visible from many different areas and vantage points, and this equipment could have a short-term visual impact on the scenic character of the region. However, these visual impacts should be considered temporary, as they are only associated with the construction phase of the Project.

During construction of overland portions of the proposed Project, vegetation clearing may be necessary within the cable corridor during installation activities. Therefore, the visual character of the vegetation may be impacted by cable installation along overland portions of the route. However, these visual impacts are considered temporary or limited, as areas cleared outside of the cable locations will be allowed to naturally regenerate and riparian vegetation will be preserved as much as possible to minimize visual impacts on shoreline habitats and other terrestrial areas along the proposed Project corridor.

Visual impacts associated with the operation of the proposed Project may result from the above-ground converter station component. To the greatest extent feasible, the converter station will be designed to blend with the surrounding landscape and architecture. The land use in the general vicinity of the proposed converter station location is largely commercial/industrial. It is anticipated that the visual impacts from the converter station will be minimal, as it is sited in an already heavily developed urban area.

4.6.2 Overhead HVDC Transmission System Alternative

The Central New York Overhead Transmission Corridor Alternative would exclusively utilize above-ground Project components and is therefore expected to have the highest level of visual impact compared with the other proposed alternatives within this analysis.

The Central New York Overhead Transmission Corridor Alternative would require additional land-clearing activities within the existing transmission rights-of-way. In addition, land clearing may be required for construction, access roads, and staging areas. In general, the longer the overhead transmission route, the more visual impacts associated with overhead components and vegetative clearing.

Several different transmission tower configurations may be utilized for the overhead alternative. In general, the potential transmission tower types can be defined as “lattice” or “monopole” designs. Lattice towers are constructed of galvanized steel and assembled on-site. These freestanding towers are widely used as transmission line support structures across the United States. Lattice towers have a relatively wide base, and their design requires greater clearance along rights-of-way. Monopole towers have a single-shaft, tubular structure. While the monopole towers generally have less visual impact, it is expected that any development of overhead lines will be visually obtrusive. The specific height and design of each monopole or lattice tower would be determined by the angle of the conductor bundles, the span between towers, and the topography. In general, for a 345-kV transmission line, the lattice or monopole steel support structures would be expected to vary from approximately 65 to 135 feet in height. Spans would range from 600 to 700 feet between monopole towers and 800 to 1,000 feet between lattice towers. This infrastructure will be highly visible from many vantage points.

4.6.3 Buried Overland HVDC Transmission System Alternative

The visual impact from the Buried Railroad Corridor Alternative Route would have a similar level of impact as the proposed Project. It is anticipated that vegetative clearing and disturbance would occur from cable trenching activities. This would represent a temporary visual impact. However, areas disturbed would be restored with respect to the existing environmental features. Depending on the overland route, additional land clearing would likely be required for service and installation equipment, access road, and construction staging areas. The visual effects from the proposed converter station would be the same as those described above for the proposed Project, although there would be a much greater impact in the short term due to the length of this alternative relative to the Project.

5.0 Discussions and Conclusions

The analysis for the proposed Project and the land based alternatives considered is described within this report and briefly summarized below.

5.1 Geologic Resources and Soils

The proposed Project is primarily located in waterways with a portion utilizing a terrestrial route along previously disturbed existing rights-of-way. Land clearing and blasting activities would be limited to the terrestrial portions of the route and are anticipated to only be required along very limited areas.

The Central New York Overhead Transmission Corridor Alternative Route is anticipated to require land clearing, blasting, and/or excavation along large portions of these routes; therefore, impacts to geologic resources and soils are anticipated to be long-term impacts.

Similar to the Overhead Alternative, the Buried Railroad Corridor Alternative Route is anticipated to require land clearing, blasting, and/or excavation activities along large portions of the overland routes. Therefore, impacts to geologic resources and soils are anticipated to be long-term negative impacts.

5.2 Terrestrial Biological Resources

The proposed Project is primarily located in waterways with a portion utilizing a terrestrial route along previously disturbed existing rights-of-way. Land clearing and blasting activities would be limited to the terrestrial portions of the route and are anticipated to only be required along very limited areas. Therefore, impacts to terrestrial biological resources are anticipated to be low or negligible.

The Central New York Overhead Transmission Corridor Alternative Route is anticipated to require land clearing, blasting, and/or excavation along large portions of these routes; therefore, impacts to terrestrial biological resources are anticipated to be long-term impacts due to habitat conversion and/or loss.

Similar to the Overhead Alternative, the Buried Railroad Corridor Alternative Route is anticipated to require land clearing, blasting, and/or excavation activities along the 400-plus miles of the overland routes. However, it is assumed that lesser areas of land clearing would be required for the Buried Railroad Corridor Alternative Route than for the Overhead Alternative.

5.3 Wetlands and Water Resources

The proposed Project is primarily sited within waterways with a portion utilizing a terrestrial route sited along existing railroad rights-of-way. The proposed Project's submarine and land cable installation methodologies are anticipated to result primarily in temporary impacts to wetlands. The only permanent impacts will be in areas where conventional dredging results in the removal of material within the maintained navigation corridors and where the cables need to be covered with sloping stone rip-rap or articulated concrete mats. Additional information regarding the specific locations where rip-rap or concrete mattress cable protection will be necessary will be provided in a preliminary EM&CP, scheduled for completion in the fourth quarter of 2010.

The Central New York Overhead Transmission Corridor Alternative Route will require land clearing, new transmission towers, and new access roads along large portions of these routes. Therefore, it is anticipated that the impact to wetlands from the excavation and filling required for new towers and access roads would represent a long-term, permanent change in wetland cover type in or near vernal pools and wetlands.

It is assumed that the Buried Railroad Corridor Alternative Route would have similar impacts to wetlands as to the terrestrial portions of the proposed Project.

5.4 Cultural Resources

The proposed Project is primarily sited within waterways and previously disturbed rights-of-way. The Central New York Overhead Transmission Corridor Alternative Route and the Buried Railroad Corridor Alternative Route are sited along existing overland corridors. Due to the greater likelihood of encountering cultural resources along overland portions, it is assumed that the impacts for the alternatives considered would be greater than for the proposed Project.

5.5 Land Use

The proposed Project is primarily sited within waterways or along previously disturbed overland corridors. Therefore, the proposed Project is not anticipated to have significant impacts on the current land use along the route.

The Overhead and Buried Alternatives are primarily sited along existing, previously disturbed corridors. Changes in land use for these alternatives will be dependent on whether significant corridor expansions and infrastructure upgrades are necessary. However, because land use designations are so closely linked to the aesthetic value of an area, the Overhead Alternative is considered to have a long-term impact on the land uses along these routes.

5.6 Visual / Aesthetics

The proposed Project and the Buried Railroad Corridor Alternative Route will have little to no impact on the visual/aesthetic resources along the routes.

The Central New York Overhead Transmission Corridor Alternative Route utilizes large overhead transmission towers and require land-clearing activities; therefore, visual/aesthetic resource impacts will be high and permanent.

5.7 Conclusions

The analysis presented above demonstrates that, while the proposed Project may have short-term impacts on some resources, the only long-term impacts would be to cultural resources where there are unavoidable areas of cultural sensitivity and to wetlands where conventional dredging or sloping stone rip-rap or articulated concrete mats are required.

Both the overhead and buried overland alternatives considered would have the same level of unavoidable impact to cultural resources, albeit in different locations, and would not have the flexibility of the proposed Project to avoid such resources. Land clearing associated with establishing and maintaining an overhead transmission corridor would represent a permanent impact to wetlands, particularly forested wetlands.

Based on an evaluation of the feasibility, consistency with the Project’s purpose and need, and the overall impacts of the proposed Project route and alternatives, CHPEI has selected the proposed Project route as the most realistic alternative as it has the least amount of environmental and cultural resource impacts while still remaining financially feasible.

Attachment A: NYSDEC and NWI Wetlands along the Proposed Project Route

Attachment B: NYSDEC and NWI Wetlands along the Central New York Overhead Transmission Corridor Alternative Route

Attachment C: NYSDEC and NWI Wetlands along Buried Railroad Corridor Alternative Route